

must be measured in the capacity of actual work accomplished and its true worth thereby established.

With my more or less early disappointing X-ray experiences in other than superficial cancer, I did not at once get excited over radium, but only after employing it over three or four years' time was it apparent to me that radium possessed outstanding merit. It is only a matter of a few late years that radium has been used with anything like a full understanding of its adaptabilities, and it can now be truthfully stated that radium has a selective field of usefulness in uterine carcinoma, singularly unchallenged by any other medical or surgical aspirant. During this period I have subjected a great many cervical cancer patients to radium radiation, not a few of whom have remained free from visible or demonstrable recurrences from periods of one, two, and three years. A far greater number, however, have been miserable failures from a curative standpoint. While no hard and fast time limit for recurrence has been established, our knowledge of the usual rapid invasion of mucous structures would seem to warrant the assumption that if a cervix remains perfectly clean and of normal consistence one year after it has been cleared from cancer by radiation, and with the patient otherwise well and free from internal invasion, that a clinical cure in the case may be expected.

What are we to think of the colossal amount of X-radiation which advanced European clinicians are promulgating, and for which cancer cures as high as 70 per cent are reported? I know of no better word than superradiation by which to placard this revolutionary method of X-ray therapy. The generating apparatus consists of transformers approximately one and one-half times more powerful than those generally employed in America. Such an instrument delivers almost a pure homogeneous gamma radiation of enormous mass and energy. Indeed, if we are to accept some of the claims, advanced radium will soon be far outdistanced by this Utopian X-ray, which will be all and self-sufficient. American engineers are busily engaged in developing even more powerful apparatus, which promises to be more revolutionary and epoch-making. Between theory and fact, however, there is a very wide departure, and I would advise no one to throw away their radium or present X-ray equipment until careful investigation and the test of time have placed their stamp of approval upon superradiation. In the meantime, it must not be forgotten that extreme danger lurks in the path of such work, and that each step must be guarded by every means known to science, in order to safeguard both the patient and operator against this potent force terrible to contemplate.

The question of surgery in uterine cancer is indeed a grave one. When the malignant condition is sufficiently advanced so that a definite diagnosis can be had, a fatal termination is the rule, irrespective of operation or radiation. In the writer's opinion, in clearly surgical cases, thermic cauterization or electrical dessication should have priority over the knife. If one can

be sure that the growth is confined wholly to the uterus, a careful hysterectomy is the proper procedure. In such cases, the surgeon and the radiologist should co-operate. Let us urge whenever possible a routine procedure along these lines. The radiologist makes an intrauterine pre-operative radium application, the surgeon operates from five to seven days later, and the radiologist follows the operation immediately with radium in the vagina and X-ray over the abdomen in the usual post-operative method. In the belief of the writer, such a procedure is the best combination that we have at the present time to combat malignancy in the female pelvis.

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### INFANTILE ATROPHY\*

#### SPECIAL REFERENCE TO FEEDING

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In presenting this paper to you today I purpose to lay stress on the use and value of malt soup and albumin milk, with modifications, in the feeding of atrophic infants.

We are, I believe, all thoroughly agreed that no artificial form of feeding is comparable with breast milk, which should always be given, if practicable, in these cases of infantile atrophy. Breast milk is not a panacea in all of these cases. Hence it is not surprising that other forms of feeding are sometimes a failure.

My experience with malt soup feedings began some fifteen years ago by using the formula of Liebig, the originator of malt soup. This was used with partial success until three years later the Loefflund's malt soup extract was obtained, and the formula, as perfected by Keller, followed. This formula, as did Liebig's, called for the same proportions of milk, flour and water for all ages, and proved very trying in any of these cases unless a condition of constipation existed.

Other preparations of malt soup extract have been tried, and fully one has given satisfactory results.

After about five years' experience with Keller's fixed formula and the difficulties arising because of vomiting and diarrhoea in many of the patients, the formulas were made elastic by making milk and water dilutions, according to the age of the infant, and using the malt soup and flour, each in quantities of from one-half to two ounces a day. If diarrhoea developed, the amount of the flour was increased and the malt soup decreased. In severe cases it sometimes is advantageous to substitute for the wheat flour, rice, barley or arrow root, or a combination of two or more of these flours.

The value of the malt soup feedings is due to the easily assimilable maltose, of which malt soup extract contains 57.5 per cent, and dextrose, 11.7 per cent, a vegetable proteid of 6.4 per cent, upon the presence of gelatinized starch, which acts as a protection against the undesirable effect of the fat and sugar, and potassium carbonate, which combats the acid intoxication, as evidenced by the disappearance of the ammonia from the urine. It

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also aids in the alkali loss which occurs in this condition.

After a period of six weeks of feeding with malt soup formulas, as with any cooked food, it is essential to administer orange or tomato juice each day. As soon as it is practicable, it is advisable to augment or substitute for a part or a whole of one or more of the malt soup feedings, a vegetable soup or clear broth, later strained vegetables, and still later a return to a simplified milk formula, in order that the vitamins which may play an important role in this disease may be supplied.

In any arrangement of formulas, malt soup feedings will be followed by diarrhoea in a percentage of these cases. The diarrhoea is usually of the fermentative type. In these patients or those suffering from infantile atrophy, albumin milk or one of its modifications is indicated. Albumin milk synonyms—protein, eiweiss, casein, calcium caseinate, larosan milk—have virtually the same composition of protein, 3 per cent; fat, 2.5 per cent; sugar, 1.5 per cent; salts, 0.5 per cent.

The following suggestions in the preparation of albumin milk have been found of value:

Dennett<sup>1</sup> states that:

"When the milk is thoroughly jellied, it is then put upon the stove and is heated to a steaming heat (160° F.), being stirred vigorously. This process is to kill the pepsin or rennet, so that it will not curdle the buttermilk when added to it later."

Julius Hess<sup>2</sup> states that:

"The completed albumin milk must not be heated above 100° Fahrenheit, otherwise it will clump"; and "In feeding, use a nipple with a large opening."

I have for some time used, for home modification and with marked success, the calcium caseinated milk, after the formula of Stoeltzner, as prepared with larosan powder. Larosan, which has been accepted by the Council of Pharmacy of the American Medical Association, appears in New and Non-Official Remedies, 1919, page 170. Larosan is a calcium caseinate and contains 2.5 per cent calcium oxide, and 97.5 per cent casein. When prepared according to the manufacturers' directions it compares favorably in composition and therapeutic value with other albumin milks.

Albumin milk favors intestinal digestion, combats acid fermentation, and increases the tolerance of the bowel in infantile atrophy.

In some patients albumin milk should be diluted with one-third to one-half boiled water. It should be fed in quantities and at intervals suitable to age, weight and condition of the patient. During the administration of albumin milk there is ordinarily no gain or a very slow gain in weight, until a carbohydrate in the form of sugar is added. When there is no vomiting or diarrhoea, we add sugar.

The form of sugar usually is cane or dextrimaltose. Some four years ago my attention was called to the value of corn syrup in infant feeding, and until recently I have used it as a sugar content in the feeding of these atrophic infants with very gratifying results. The corn syrup

is introduced in 3 per cent strength and increased up to 12 per cent. A gain in weight occurs when enough corn syrup is added to furnish sufficient calories. It is sometimes possible to bring value of the food up to twenty-five calories per ounce. The important feature of corn syrups is the high percentage of dextrines and glucose combined with the lower percentage of maltose. Value, 110 calories per ounce.

The advantages of corn syrup are the mixed sugars which are split up in the intestines at varying intervals. The results obtained by using corn syrups in infantile atrophy has been so satisfactory that it has been used exclusively in these cases until recently. In some instances the corn syrup is given in a 10 per cent dilution, with water between feedings.

Recently a dextrose or chemically pure glucose obtained from maize has been used in several cases. It is now being used with very satisfactory results in three cases of infantile atrophy at the Johnston-Wickett Clinic in Anaheim. This dextrose is employed in amounts up to three ounces per day without unfavorable results. The examination of the urine and stools, as reported from the clinical laboratory, have been negative for sugar. We have added to our list a sugar which gives promise of being superior to any other in the feeding of infantile atrophy patients.

#### SUMMARY

1. The use and value of malt soup in infantile atrophy is in cases:
  - (a) In which maternal or wet nurse feedings are impracticable or unsuccessful.
  - (b) In infants over three months of age.
  - (c) In which there is not present diarrhoea.
2. The use and value of albumin milk in infantile atrophy is in cases:
  - (a) In which maternal or malt soup feedings are not applicable.
  - (b) In infants under three months of age.
  - (c) In which there is present diarrhoea.
  - (d) Larosan milk (calcium caseinate milk) has practically the same composition as other albumin milks, and is easy to prepare.
3. Corn syrup, in conjunction with albumin milk, is applicable:
  - (a) When sugar is required.
  - (b) Because it is readily absorbable and less irritating to the gastric and intestinal mucosa, even in high percentages, than other sugars commonly used.
4. Dextrose, chemically pure glucose derived from corn:
  - (a) Apparently requires no expenditure of energy on the part of the digestive system.
  - (b) Non-irritating to gastric intestinal mucosa, readily and completely absorbable, not found in the urine and feces, following administration in high percentage.

#### References

1. Dennett, R. H.—Text-book. Simplified Infant Feeding, 1920, p. 129.
2. Hess, Julius—Text-book. Principles and Practice of Infant Feeding, 1920, p. 295.